Math 151 Project

2/28/15

Morgan Messina, Kayla Vickers, Kenyonna Wright

Addition

Definition: The sum of two numbers in a combined total number of objects from putting together two collection of objects, of given sizes.

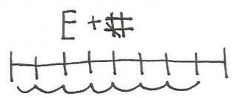
Other possible definitions listed below help to support the above overall definitions, as well as help to illustrate the addition process.

- When putting groups of items together, how many do you get?

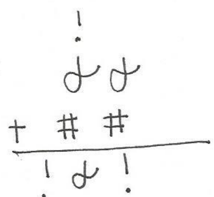
  A + B = ?

- ? − B = A

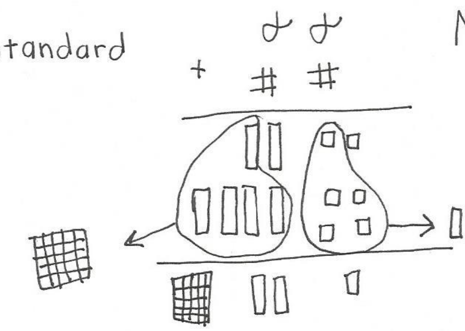
- Use of a number line



Example:



Standard



Manipulatives

The use of the standard algorithm shown above shows how the definition of addition is true. The combining of (♂♂) and (# #) give the larger solution of (! ♂ !).

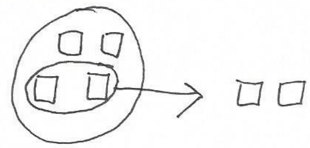
In each case shown above, the place value of ones and tens is important in solving. When the ones place solution exceeds the highest symbol in this case, the one is carried or combined into the tens place.

The manipulatives example shows the visual of breaking apart the combined ones and tens place in order to create the maximum solution in each place value.

Subtraction

Definition: The total amount of objects in a group after taking some given amount of objects away from another group of objects.

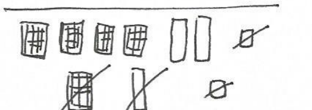
− ♂ =



Example:

```
  # ♂ !      Standard
-  ! ! !
 -------
  E ! @
```

```
  # ♂ !      Manipulatives
-  ! ! !
 -------
```



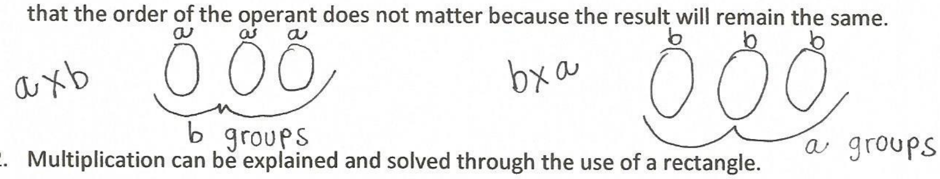
```
  E   !  @
```

In the standard algorithm example above, the place value is here too important for "carrying" the extra symbol into the next larger value. The manipulatives show the visual of breaking apart the larger manipulatives to create smaller ones in order to have an even resut (with no remainder).

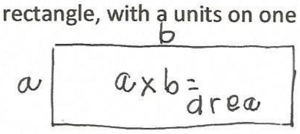
Multiplication

Definitions:

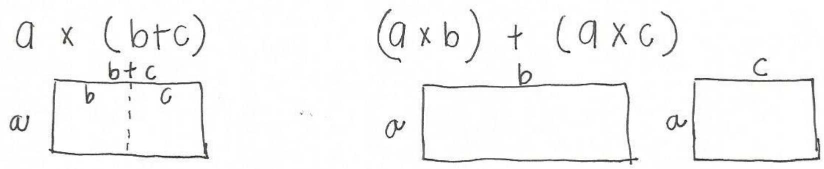
1. axb and bxa- This definition shows the use of the *commutative property*, which is the idea that the order of the operant does not matter because the result will remain the same.



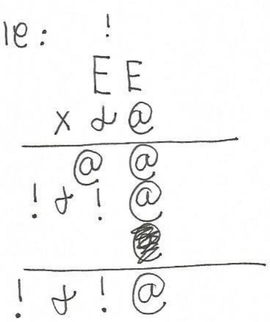
2. Multiplication can be explained and solved through the use of a rectangle. axb is the area of a rectangle, with a units on one side and b units on the other



3. ax(b+c)= (axb) + (axc)- This definition shows the use of the *distributive property* of the variables to solve multiplication.



Example:



* Important to keep place value in line

When multiplying two numbers you may have to "carry" the extra if the solution is too much for one place value. in this case (ↀ)(E) is too great for the known symbols, so (!) is carried in the next place value.

Division

Definition:

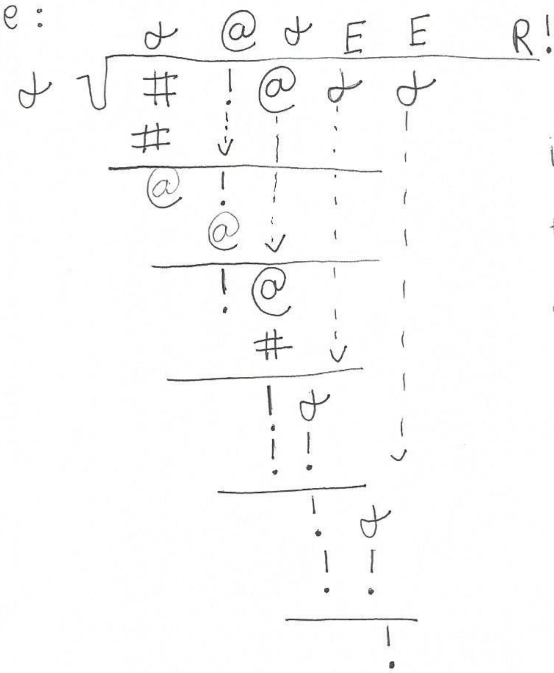
1. a/b is defined by how many collections of b, can be placed into a, without any collection left over.
2. The number c so that bxc=a

@ ÷ !! = @

!! ÷ @ = undefined

} Two important rules to consider. They explain the rule of no symbols and no possible way of taking symbols away from @.

Example:



The (ɗ) is divided into each other symbol. This act then requires to multiply the symbols. The @ is brought down each time to increase the value of each step.

* "Bringing Down" the next place value is to keep the correct place and symbolizes the distribution of breaking up the next higher block (flat, stick).

PART II

Addition

If Suzie has 3 boxes of cereal at home and gets 4 more when she goes to the grocery store, how much cereal does Suzie have?
Addition is used to solve this problem. This is because there are 2 known collections of objects being combined to form one, even larger collection of objects.

Subtraction

Karen had 11 apples when she started shopping and only had 9 when she checked out. How many apples did Karen eat in the while shopping?
Subtraction is used in to solve this problem because you are taking away a small collection of objects from a larger collection of objects. The new collection of objects will be smaller than the large collection of objects.

Multiplication

If you are at dinner with 8 people, how many individual shoes, including yourself, are at the dinner table?
Multiplication is being used because a large collection of objects in being made by using the equation $A \times B = C$.

Division

There are 3 girls at your slumber party and you all make a dozen cookies. How many cookies does each girl get?
This problem uses division because you breakup a large collection of objects into multiple, smaller collections of objects. You can also use the equations $A \div B = C$ which is the same as $B \times C = A$

PART III

1. Using manipulatives solve the problem and explain the all the exchanges.

```
      ##&!
+    &#@!
```

---

2. Using manipulatives solve the problem and explain all the exchanges.

```
    &#!
X    #!
```

---

3. Preform this problem using the standard algorithm for addition and explain how it can also work using manipulatives.

```
      ##&!
+     &#@!
```

---

4. Preform this problem using the standard algorithm for multiplication and explain how it can also work using manipulatives.

```
      &#!
X      #!
```

---

5. Preform this problem using the standard algorithm for subtraction and explain how it can also work using manipulatives.

```
    &&#
-    #!@
```

---

6. Using manipulatives solve the problem and explain all the exchanges.

```
    &&#
-    #!@
```

---

7. Using manipulatives solve this problem and explain all the exchanges.

```
    &&&
-   !!#
```

---

8. Preform this problem using the standard algorithm for division and explain how it can also work using manipulatives.
   & divided by #&#!

9. Using manipulatives solve this and explain all the exchanges.
   & divided by #&#!

10. Sally had 5 dimes 5 pennies and 5 nickels how many dollar amounts can she make?